

CLAIMS

1. A method for classifying a type of bottom on a bottom under a liquid, which method comprises the steps of

- performing an acoustic reflection measurement, in which a first attribute is determined which represents a strength with which acoustic waves are reflected from a location on the bottom through the liquid in a reflection direction;

characterized in that the method further comprises the steps of

- performing an acoustic scattering measurement, in which a second attribute is determined of acoustic waves that are scattered essentially from said location on the bottom;

- providing a search unit, which contains information with regard to different combinations of the values of the first and second attributes, and associates said combinations with respective bottom classifications; and
- identifying a bottom classification of said location on the basis of the bottom classification which the search unit associates with a combination of the first and second attributes.

2. A method according to claim 1, characterized in that performing the reflection measurement and the scattering measurement comprises the step of normalizing the measured reflected and scattered signal by compensating for acoustic effects involved in at least propagation in the liquid.

3. A method according to any one of the preceding claims, wherein the waves for the scattering measurement and the reflection measurement are transmitted with transmitting means, characterized in that the reflection measurement is performed such that measurement is done on waves traveling in a direction perpendicular from the transmitting means to the bottom and back and that the scattering measurement is performed such that

measurement is done on waves traveling at an angle relative to said perpendicular direction from the transmitting means to the bottom and back.

4. A method according to any one of the preceding claims, characterized in that performing the reflection measurement and scattering measurement
5 comprises the step of generating just one actuation signal for the purpose of both measurements, after which, upon reception, reflection and scattering of the one actuation signal are distinguished.
5. A method according to claim 4, characterized in that just one receiver records the reflected and scattered signal, with the reflected and scattered
10 signal being distinguished by the use of a time window.
6. A method according to any one of the preceding claims, characterized in that the second attribute represents a Lambert scattering parameter.
7. A method according to any one of the preceding claims, characterized in that an actuation signal with a frequency spectrum that is substantially above
15 50 kHz causes the scattered signal.
8. A measuring device for classifying a type of bottom under a liquid, which device is provided with
 - transmitting means arranged for generating acoustic actuation signals;
 - receiving means arranged for recording a first attribute of a reflected signal
20 that is reflected from a location on the bottom through the liquid in a reflection direction;
 - calculating means arranged for assigning a bottom classification on the basis of the first attribute, characterized in that the receiving means are further arranged for distinguishing a signal scattered from the bottom and recording
25 a second attribute of the scattered signal, and that the calculating means comprise a search unit in which information has been programmed which associates bottom classifications with respective combinations of values of the first and second attributes, while the calculating means are arranged for identifying the bottom classification by associating a combination of the first
30 and second attributes with information from the search unit.

9. A measuring device according to claim 8, characterized in that the receiving means comprise a receiver which is arranged for recording both the reflected and the scattered signal, and for distinguishing the respective signals by the use of a time window.
- 5 10. A measuring device according to claim 8, characterized in that the transmitting means and the receiving means respectively comprise a first transmitter and a first receiver for the purpose of the reflection measurement, the first transmitter and the first receiver being designed with a single transducer.
- 10 11. A measuring device according to claim 8 or 10, characterized in that the transmitting means and the receiving means respectively comprise a second transmitter and a second receiver for the purpose of the scattering measurement, the second transmitter and the second receiver being designed with a single transducer.
- 15 12. A computer program product for classifying a type of bottom under a liquid, which computer program product comprises instructions for causing the following steps to be carried out:
- recording a first attribute of a reflected signal of a reflection measurement on acoustic waves being reflected from a location on the bottom through the
 - 20 liquid in a reflection direction,
 - recording a second attribute of a scattered signal of a scattering measurement on acoustic waves being scattered essentially from said location on the bottom;
 - assigning different bottom classifications to respective combinations of
 - 25 values of the first and second attributes.
13. A computer program product according to claim 12, characterized in that the product further contains instructions for causing the following steps to be carried out:
- measuring the reflected and scattered signal with the aid of a receiver, and

- normalizing the measured reflected and scattered signal by compensating for acoustic effects involved in at least propagation in the liquid.